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**Listings from the Emerging Economies:  
An Opportunity for Reputable Stock Exchanges**

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## **Listings from the Emerging Economies: An Opportunity for Reputable Stock Exchanges**

### **Abstract**

We provide current evidence to show that the numbers of sponsored depositary receipts created and cross-listed have increased by more than two-fold over the last decade and a substantial proportion of this growth came from the emerging and developing economies. We argue that the needs of this clientele and the inadequacies of existing legal and financial system create an opportunity for reputable stock exchanges to play the role of an information and reputation intermediary and in so doing allow exchanges to leverage on their reputation capital to compete more effectively for the growing business from the emerging and developing economies. We contribute further by developing a parsimonious model to analyze the interaction between an exchange playing the new role and firms seeking to list their equity on the exchange. We show that a subgame perfect equilibrium is obtained and provide an explanation for the spike in delisting in the latter half of 2007. Our model fills an important gap by addressing some shortcomings in existing theoretical models.

## **Listings from the Emerging Economies: An Opportunity for Reputable Stock Exchanges**

### **1. Introduction**

There has been an unprecedented growth in the number of sponsored depositary receipts (SDRs) and cross-listings over the last two decades. This explosive growth has attracted the attention of academics and spawned numerous studies that seek to explain why firms would list their shares on overseas exchanges and measure the share price reactions to such listing decisions. Firms opt to list on overseas exchanges for various reasons but ultimately the decision to cross-list hinges on whether the benefits derived from cross-listings outweigh the costs. The conventional wisdom, which is the focus of earlier studies through the 1990s (Errunza and Losq, 1985; Alexander, Eun and Janakiramanan, 1987, ; Chowdhry and Nanda, 1991; Foerster and Karolyi, 1993, 1998, 1999; Howe, Madura and Tucker, 1994; Lau, Diltz and Apilado, 1994; and Miller, 1999 among others), is that listing on overseas exchanges help to overcome barriers to cross-borders investment and bring about benefits such as lower cost of capital, greater liquidity in the trading of the shares, and prestige and better visibility for the listing firms.

But Stulz (1999) observes that the conventional wisdom at that time cannot adequately explain the documented decline in the cost of capital associated with the cross-listing of firms from the emerging economies<sup>2</sup>. The decline in cost of capital is much lower than predicted by theory. Stulz argues that the impact of globalization on the cost of capital is likely attenuated by home bias which is a manifestation of the information asymmetry problem and ultimately a product of the poor corporate governance of firms from the emerging economies (see Stulz, Pinkowitz, and Williamson, 2003). Stulz's critiques and suggestions lead to a series of new studies<sup>3</sup> (Coffee, 2002; Reese and Weisbach, 2002; Doige, Karolyi and Stulz, 2004; Doidge 2004a, 2004b; and Doidge, Karolyi, Lins, Miller and Stulz, 2005; Bianconi and Tan,

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<sup>2</sup> For ease of exposition, we will use the term "emerging" economies to refer to "emerging and developing" economies.

<sup>3</sup> Karolyi (2006) provides an excellent review of this and earlier literature.

2010 among others) that look beyond the conventional wisdom and into how the legal environment and corporate governance structure affects the costs and benefits of cross-listing<sup>4</sup>. Our paper is a contribution in this direction. We are interested in exploring how a reputable stock exchange like the New York Stock Exchange can help to mitigate the information asymmetry problem and how the exchange can strategically position to compete more effectively for the growing listing business from the emerging economies.

We will provide current evidence to establish the fact that the listing business from the emerging economies has grown by more than two-fold over the recent decade and this growth will likely continue. This trend presents the stock exchange industry with significant business opportunities and creates an opportunity for reputable exchanges to play a new role, that of an information and reputation intermediary. We will argue that the regulatory bodies, investment banks, rating agencies, and financial analysts cannot fully address the information asymmetry problem faced by firms from the emerging economies, so there is room for reputable stock exchanges to play the role of an information and reputation intermediary. Since this new role leverage on the exchange's reputational capital, reputable exchanges will be able to compete more effectively for the growing listing business from the emerging economies.

Furthermore, we add to the theoretical literature by developing a parsimonious model to analyze the dynamic interaction between an exchange playing the new strategic role and firms deliberating whether or not to cross-list on the exchange. Our model is closely related to Doidge, Karolyi and Stulz (2004) and Chemmanur and Fulghieri (2006)<sup>5</sup>. Our aim is to develop a simple enough model to address the shortcomings in the models developed in these two papers and to account for observed empirical evidence. Unlike Doidge et al (2004) which take the exchange's listing requirement as exogenous, we

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<sup>4</sup> One related study outside the cross-listing literature is Kuipers, Miller and Patel (2009) which explore how the legal environment affects valuation in cross-border takeovers.

<sup>5</sup> Ours is an example of a model of financial markets with asymmetry information; a comprehensive review of such models is provided by Ardalan (1998).

investigate the equilibrium that emerges as a result of the dynamic interaction between the decisions of an exchange and a listing firm where both are striving to maximize their value. Hence our model is able to shed light on the decision of the exchange as well as the decision of a foreign firm that is contemplating whether to list or delist from the exchange. Chemmanur and Fulghieri (2006) is an ambitious attempt to address a multitude of questions related to competition in the exchange industry. Although Chemmanur and Fulghieri also investigate the interaction between reputation and listing standards, there are two shortcomings in their reputation model. First, they model the effect of reputation by assuming the presence of a "Standard Maximizing" exchange that is not concerned with maximizing value. Second, they ignore the compliance costs<sup>6</sup> that listing firms will have to incur if they choose to list on an exchange. This is an important consideration for listing firms since there is a tension between the potential of gaining value from listing on a high quality exchange and the incurrence of higher compliance costs imposed by a high quality exchange. Both assumptions in Chemmanur and Fulghieri are unrealistic. We endogenized the effect of reputation in the payoff function for the exchange and incorporate the compliance costs in the payoff function for the listing firms. Thus, our model fills an important gap in the theoretical literature.

This paper is organized as follows. In Section 2 we provide recent evidence on the growth trend in SDRs and listings of SDRs. In Section 3, we make a case for the new strategic role that a reputable exchange can play to compete more effectively for the growing clientele from the emerging economies. Section 4 develops our theoretical model and Section 5 discusses our solution. Section 6 concludes.

## **2. Growth Trend in Sponsored Depositary Receipts and Cross-listings**

Table 1 summarizes the growth in the number of SDRs and the number of cross-listed SDRs from 1970 to 2010. The data is a count of the newly created SDRs and cross-listed SDRs in each of the three periods: 1970-1989, 1990-1999 and 2000-2010. This data, which includes SDRs from all the major

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<sup>6</sup> Chemmanur and Fulghieri only take into consideration the listing fees incurred by the listing firms.

depository banks such as Bank of New York Mellon, Citibank, Deutsche bank, J. P. Morgan Chase and Computershare Trust, was downloaded from the Bank of New York Mellon’s depository directory<sup>7</sup> on May 11, 2010. Accordingly, the data for 2010 covers only the first four plus months for 2010. Table 1 focuses only on the three geographic regions that contribute the most numbers of SDRs and cross listings. The three regions are Asia, Europe and Latin America. To shed light on what proportion of the growth arises from the emerging and developing economies, we further segregate the data for Asia and Europe into companies from advanced and non-advanced economies as defined by the International Monetary Fund (IMF)<sup>8</sup>. In the case of Latin America, none of the countries in the dataset are classified as an advanced economy by the IMF. A list of countries from Asia and Europe that are classified as advanced economies by the IMF is provided in Table 2.

[INSERT TABLE 1 HERE]

[INSERT TABLE 2 HERE]

There are several noteworthy patterns in Table 1. The total number of SDRs created and cross-listed in the last ten years alone more than doubled the total number of SDRs created and cross-listed in the three decades stretching from the 70s to the 90s. Not surprisingly, most of the growth in SDRs and cross listings emerged after 1990. In terms of the numbers of SDRs created and cross-listed either in aggregate or dispersed over time, Asia took the lead followed by Europe and Latin America. The numbers of SDRs and SDRs that were cross-listed had increased by more than twofold going from the 1990s to the 2000s. Focusing on the growth pattern in Asia over this period, we see that the number of SDRs from Asia increased from 304 in the 1990s to 628 in the 2000s. The numbers of SDRs that were cross-listed increased from 188 to 462 over the same period. Hence, approximately 62% and 74% of the

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<sup>7</sup> The website for BNY Mellon’s depository receipts directory is [http://www.adrbnymellon.com/dr\\_directory.jsp](http://www.adrbnymellon.com/dr_directory.jsp).

<sup>8</sup> In the rest of the paper, for ease of exposition, we will use the term “emerging and developing economies” to refer to “non-IMF advanced economies”

SDRs were cross-listed in the 1990s and the 2000s respectively. The numbers of cross-listings had increased by 146 percent over this period. Moreover, a significant proportion of the SDRs and cross listings in Asia came from the emerging economies, in particular, China and India. The emerging economies contributed 139 out of 304 SDRs in the 1990s and 341 out of 628 in the 2000s. In other words, the number of SDRs from the emerging economies in Asia has increased from about 46 percent in 1990s to 54 percent in the 2000s. Out of the 139 SDRs created in the 1990s, 99 came from China and India alone. In 2000s, the number of SDRs from China and India increased to 319 out of a total of 341. The number of cross-listed SDRs from the emerging economies in Asia increased from 60 in 1990s to 242 in 2000s, a 300 percent increase. The number of cross-listed SDRs from the emerging economies expressed as a percentage of the total number of cross-listed SDRs has increased from 32 percent to 54 percent. Again, China and India were the leading contributors to this growth; 225 out of the 242 SDRs cross-listed in 2000s were from China and India.

Similar growth patterns, perhaps not as pronounced, are observed for Europe and Latin America. For Europe, 94 out of the 218 SDRs created in the 1990s and 257 out of the 529 SDRs created in 2000s were from the emerging economies. The number of SDRs from the emerging economies has increased by 173 percent going from the 1990s to the 2000s. The total number of cross-listed SDRs from Europe was 142 in 1990s and 365 in 2000s. The numbers of cross-listed SDRs that originated from the emerging European economies was 50 in the 1990s and it increased to 117 in the 2000s, a 134 percent growth. The numbers of SDRs and cross-listed SDRs from Latin America have increased by about 150 percent and 100 percent respectively going from the 1990s to the 2000s.

### **3. A New Strategic Role for Stock Exchanges**

The evidence presented in Table 1 reveals that in the recent ten years there has been tremendous



growth in the creation and listing of SDRs<sup>9</sup>. This presents significant listing opportunities for stock exchanges in the United States as well as other developed countries. What is worth noting is that the composition of the clientele has changed – a larger proportion of the firms that are seeking to list their equity are now from the emerging economies. Unlike firms from the developed economies, firms from the emerging economies are plagued with severe information asymmetries. This information asymmetry problem is a product of various deficiencies in the emerging economies including lax disclosure requirements, lack of experienced financial analysts to evaluate the firms, weak corporate governance, weak legal protection for minority shareholders, and the absence of a market for corporate control in terms of takeovers and leveraged buy outs so there is no mechanism available to discipline the managers and align the managers' interests with the investors. But firms from the emerging economies can circumvent these deficiencies by cross-listing their equity on an established exchange in a developed economy.

Putting aside any consideration for costs, the United States possibly provides one of the best solutions to the problems faced by the firms from the emerging economies. However, the solution offered by the United States is less than perfect. Even though the United States is known to impose stringent securities laws, Licht (2001a, 2001b, 2003) finds that in many cases the Security Exchange Commission (SEC) takes a hand-off approach and seldom enforces the laws on the foreign issuers. Similarly Siegel (2005) finds that the SEC has not been responsive to violations by foreign issuers. Looking back as far as 1933, the year when the first federal securities law was enacted, Siegel is only able to find 25 instances of private legal actions against foreign firms<sup>10</sup>. If the SEC cannot adequately

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<sup>9</sup> Although there was a dip in the creation of SDRs recently because of the financial crisis, it seems that the trend has picked up again at least in the case of Asia. For Asia, the number of SDRs created has declined from a high of 97 in 2007 to 49 in 2008 but has subsequently increased to 67 in 2009. Over half of these SDRs are from the emerging economies. For Europe, the number of SDRs created has declined from a high of 111 in 2007 to 97 in 2008 and then further declined to 38 in 2009. We think this is due to the continuing financial crisis in Europe which may have affected the growth prospects of the firms that are considering cross-listing their equity.

<sup>10</sup> Coffee (2002) argues that this is due to the fact that many cases were settled out of court.

address the information asymmetry problem, perhaps the other channels of controls—the investment banks, rating agencies and financial analysts—can make up for SEC’s failings? Unfortunately investment banks, ratings agencies and financial analysts (especially on the sell side) are handicapped by conflicts of interests because they have a financial interest in offering favorable recommendations or ratings for their clients as we have witnessed in the events that led to the current financial crisis. For this reason their subjective opinions and advices will be taken with a big grain of salt. At best, they can only partially resolve the information asymmetry problem between the corporate insiders and external investors. Furthermore, it is typical that very few analysts will be assigned to cover the newly cross-listed firms and the assigned analysts will in all likelihood not be the most reputable ones in the industry. Hence, there is a dearth of reliable quality information about these new firms from the emerging economies.

The discussion above highlights the fact that there is room for someone to play the role of an information and reputation intermediary. What we need is a reputable entity with the right motivation and incentives to supply this information. An ideal candidate for this role is the stock exchange. Unlike investment banks and rating agencies, stock exchanges derive their revenues from listing and trading fees, so it is in their interests to list firms that will likely be successful in the long run. The interests of the exchanges and investors are therefore aligned so the stock exchanges have the right incentives to evaluate the listing firms objectively. Moreover, by serving as information intermediaries, reputable exchanges provide a valuable service to firms from the emerging economies and are in a better position to attract the listing business from the emerging economies. However, for stock exchanges to serve as credible information intermediaries, they will need to do more than what they currently practice. They will need to conduct due diligence on the listing firms beyond merely checking for compliance with their listing requirements. Macey and O'Hara (2002) suggest looking beyond the size of listing firms and focus on factors such as “business plans and prospects, integrity and quality of management, commitment to

following sound, conservative accounting practices and good corporate governance." We will refer to this expanded set of requirements as simply the "listing requirements" in our model.

#### **4. The Game**

The evidence presented in Section 2 shows that there is a growing number of companies from the emerging economies, for instance China and India, which seek to list their shares in well developed and established markets, particularly in the United States and Europe. We argue in Section 3 that the needs of this clientele couple with the inadequacies of the existing legal and financial system create an opportunity for a stock exchange to leverage their reputation to play the role of an information and reputation intermediary. In this section, we develop a model to analyze the dynamic interaction between an exchange playing the proposed role and firms seeking to list their equity on the exchange.

We assume there is a reputable stock exchange such as the New York Stock Exchange that self-imposes a minimum listing requirements. Any firm that is listed on an exchange must then meet this level of requirements. The exchange lists foreign firms from emerging economies, such as China and India, in addition to firms from the developed economies with known quality. Assume for simplicity that there is one emerging economy. The true prospective values of firms in the emerging economy are uncertain to investors and the stock exchange. However, they know the probability distribution of the prospective values. For ease of exposition, in the rest of the paper we will refer to prospective value as simply "value." Further assume that all these firms are already listed in the local exchange in the emerging economy.

Assume that the value of every firm, denoted by  $v$ , is uniformly distributed along the unit interval, i.e.  $v \in [0,1]$ . We normalize the number of firms in the developing economy to unity and assume it to be continuous for simplicity. The management of each firm tries to maximize the value of

his firm, as perceived by investors, net of listing costs. We further assume that each firm has one share to list in the reputable foreign exchange if it chooses to cross list.

Our game is a game of adverse selection similar to Akerlof ( 1970). It is a sequential game. First, the stock exchange chooses its listing requirements,  $\theta \in [0,1]$ . Second, firms choose whether to cross list their stock by which they will have to comply with the foreign exchange's listing requirement,  $\theta$ . It is worth emphasizing that the listing requirements are chosen endogenously. The payoff functions are defined as follows. The payoff function for the stock exchange is given by:

$$u = R - C/\theta \quad (1)$$

where  $R$  and  $C/\theta$  are the revenue and cost functions for the exchange. An exchange derives its revenues from two primary sources, a fixed listing fee and a trading fee that varies directly with the level of the trading volume of the listed shares. Since trading volume varies in general with firm size and trading fees have become a dominant source of revenues for exchanges, we express the revenue function as  $R = f \int_{\underline{v}}^1 v dv$  where  $f > 0$  is a constant and  $\underline{v}$  is the minimum firm value for firms that choose to cross-list on a foreign exchange for a given listing requirement,  $\theta$ .

The cost function ,  $C/\theta$ , is the cost borne by the exchange for managing the listed firms. We assume that  $0 \leq C < 1$ ,  $C' > 0$ , and  $C'' \geq 0$ . We have endogenized the reputational capital in the proposed cost structure. An exchange, by setting a lower  $\theta$  will attract more firms but with lower quality, so this will have a negative effect on its (marginal) cost for two reasons. First, as more companies are listed, the marginal cost of listing should increase or remain unchanged. This is in accordance with the non-decreasing marginal cost of production which is typically assumed in firm theory. The same rationale is expected to apply for an exchange. Second, lowering the listing requirement will attract lower quality companies. Since the due diligence process will be more costly for lower quality companies and these companies are more likely to affect the reputation of the exchange

adversely, increasing the listing of lower quality companies will increase the exchange's marginal cost of listing. In the rest of the paper we will assume that  $C$  is a quadratic function,  $C = cQ^2$ , where  $c > 0$  is a constant and  $Q = \int_{\underline{v}}^1 dv$  is the number of companies listed by the exchange.

A representative firm payoff function is given by:

$$\pi = E(v|i) - i\theta^2/v \quad i = 1,0 \quad (2)$$

where  $E(v|i)$  is the expected value of the firm conditional on being cross-listed on the foreign exchange ( $i = 1$ ) or not being cross-listed ( $i = 0$ ). Empirical evidence (Reese and Weisbach, 2002; Doidge, Karolyi, and Stulz, 2004, 2009; and Hail and Leuz, 2005) shows that firms that choose to cross-list their equity in general have better growth opportunities but are unable to realize the full value of the growth opportunities in their domestic markets because of information asymmetries between the corporate insiders and the external investors, little or no access to capital to support the growth, and weak corporate governance and protection for the minority shareholders. By listing their equity with a reputable exchange in a developed economy, cross-listing firms can enjoy various benefits including the certification of their quality by a reputable exchange, easier access to capital at lower cost, better corporate governance and better protection for minority shareholders. The second term,  $i\theta^2/v$  is the total cost to the firm for cross-listing its shares. The total cost reflects the cost incurred by the firm to comply with the exchange's listing requirements. Since firm value appears in the denominator of the cost function, the marginal cross-listing cost is decreasing in the value of the firm. Our intent is to model the observation that compliance is less costly for higher quality firms. This is in the same spirit as Spence (1973), where he assumes that education is less costly for more productive workers.

## 5. Analysis and Discussion

This section investigates the behavior of the exchange and firms in a sub game perfect equilibrium. The manager of a firm knows the true value of her firm. Given a listing requirement announced by the exchange and the fact that listing is costly, there must exist a lower bound on the value of the firm below which the manager will not be willing to cross list its share on the exchange. Consider a firm with a true value  $v$ . For this firm to be willing to cross list, the lower bound for the firm value should satisfy  $v - \theta^2/v = 0$ . That is, the manager would be willing to cross-list on the exchange if the true value of the firm is at least equal to  $\theta$ . Even though investors do not know the true value of the firm, they are aware of the lower bound face by the management. Thus, to the investors, the expected value of any firm that cross lists on the reputable foreign stock exchange is equal to  $(1 + \theta)/2$ . Similarly, the expected value of a firm that chooses not to cross-list on the exchange will be  $\theta/2$ . Hence, given the listing requirement,  $\theta$ , set by the stock exchange, a value maximizing firm will need to solve the following:

$$\max_{i \in \{0,1\}} \pi = (i + \theta)/2 - i\theta^2/v \quad (3)$$

Since cross listing is costly, any firm that cross-lists will choose to meet only the minimum level,  $\theta$ , that is imposed by the exchange. Consequently, a firm with value,  $v$ , will be indifferent between cross-listing or not if its payoff satisfies  $(1 + \theta)/2 - \theta^2/v = \theta/2$ . From this condition, we observe that firms that choose to cross-list must have a value,  $v$ , of at least  $2\theta^2$ . We also require  $2\theta^2 \geq \theta$  for all the listing firms because the minimum value of the listing firm cannot be less than the listing requirement,  $\theta$ . There is an upper bound to the listing requirement; if  $\theta > \sqrt{1/2}$ , it will not be beneficial for any firm to cross lists. Thus, we have the following result.

**Proposition.** *In a subgame perfect equilibrium, if  $1/2 \leq \theta \leq \sqrt{1/2}$ , all firms with values  $v \in [2\theta^2, 1]$  will cross-list on the foreign reputable exchange while all firms with values  $v \in [0, 2\theta^2]$  will not cross-list. Otherwise none of the firms will choose to cross-list.*

Now consider the first stage of the game where the stock exchange chooses its listing requirements. The reputable foreign stock exchange maximizes (1) subject to its market share defined by Proposition 1, that is

$$\max_{\theta} U = f \int_{\underline{v}}^1 v dv - c \left[ \int_{\underline{v}}^1 dv \right]^2 / \theta$$

where the minimum value of a listed firm,  $\underline{v}$ , is  $2\theta^2$ . From the first order condition of this maximization problem we obtained

$$c = \frac{8f\theta^5}{-12\theta^4 + 4\theta^2 + 1}$$

[INSERT FIGURE 1 HERE]

Figure 1 shows a plot of  $c$  versus  $\theta$  for  $\theta \in [0, \sqrt{1/2}]$  and  $f = 1$ . We see from the plot that as long as  $f$  is positive,  $c$  will be positive. This is consistent with the assumptions made about  $c$  and  $f$ . Accordingly, the second order condition is met since  $d^2u/d\theta^2 = -(24f\theta^2 + 24c\theta + 2c/\theta^3) < 0$ . Hence, a subgame perfect equilibrium exists as described in the proposition.

Although our model has over simplified the actual interaction between the exchange and listing firms, our results are nonetheless consistent with the findings in the literature. In 2007, the Exchange Act Rule 12h-6, which is intended to simplify deregistration procedure, was adopted by the SEC. Immediately following the adoption of this rule, there was an increase in deregistration activity in the second-half of 2007. Doige, Karolyi and Stulz (2009) look into the reasons for the deregistration and conclude that the firms that chose to deregister do so because they have poor growth prospects going

forward and therefore have less need for external capital. In our model, the equilibrium level of listings is affected by the distribution of firm value. When there is a change in the growth prospects for the firms, this distribution will change and will cause the equilibrium level of listings to shift. We can therefore interpret the increase in deregistration activity in the latter half of 2007 as a result of a downward shift in the equilibrium level of listings that is triggered by a change in the underlying distribution in firm value. Though there is only one exchange in our model, we can infer that if there are multiple exchanges in our model, each with a distinct level of reputation capital, the equilibrium outcome will be a segmented market where each exchange will choose to serve a particular segment of the clientele. Our model if extended to include multiple exchanges will neither result in “a race to the bottom” where exchanges compete by continually lowering their listing standards or “a race to the top” which is the reverse of the former outcome. Consider for instance the case where we have two exchanges, one with a high reputation and the other a low reputation. In our set up, it will not make sense for the lower reputation exchange to set a listing requirement that is equal or higher than that set by the higher reputation exchange because firms that can meet the listing requirements of the high reputation exchange will not choose to list their equity with the low reputation exchange. The rational choice for the low reputation exchange is to set a lower listing requirement to attract those firms that find listing on the higher reputation exchange unfeasible.

## **6. Conclusion**

We provide current evidence to show that the numbers of sponsored depositary receipts created and cross-listed have increased by more than two-fold over the last decade and a substantial proportion of this growth came from the emerging and developing economies. This trend presents the stock exchange industry with significant business opportunities. The firms from the emerging economies face severe information asymmetries in the market and have a dire need for a credible entity to signal their qualities. We argue that the SEC, investment banks, rating agencies, and financial analysts cannot fully



address the information asymmetry problem faced by these firms. Hence, there is room for someone to play the role of an information and reputation intermediary. What we need is a reputable entity with the right motivation and incentives to supply this information. We argue that an ideal candidate for this role is the stock exchange because the incentive structure for an exchange motivates the exchange to list firms that are likely to be successful in the long run. Accordingly, stock exchanges have the right incentives to evaluate the listing firms objectively. Since the proposed role leverage on the exchange's reputational capital, reputable exchanges will be able to compete more effectively for the growing listing business from the emerging economies. We contribute further by developing a parsimonious model to analyze the interaction between an exchange playing the new role and firms seeking to list their equity on the exchange. We show that a subgame perfect equilibrium is obtained and provide an explanation for the spike in delisting in the latter half of 2007. Our model fills an important gap by addressing some shortcomings in existing theoretical models.

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**Table 1. Growth Trend for Sponsored Depositary Receipts and Cross-listings**

<b>Geographic Region</b>	<b>1970-89</b>	<b>1990-99</b>	<b>2000-10</b>	<b>Total</b>
<b>Asia</b>				
No. of SDRs	23	304	628	955
No. of cross-listed SDRs	23	188	462	673
<b>Asia (excluding IMF Advanced Economies)</b>				
No. of SDRs (China & India Only)	0	139 (99)	341 (319)	480
No. of cross-listed SDRs (China & India Only)	0	60 (37)	242 (225)	302
<b>Europe</b>				
No. of SDRs	9	218	529	756
No. of cross-listed SDRs	9	142	365	516
<b>Europe (excluding IMF Advanced Economies)</b>				
No. of SDRs	0	94	257	357
No. of cross-listed SDRs	0	50	117	167
<b>Latin America</b>				
No. of SDRs	0	79	198	277
No. of cross-listed SDRs	0	63	126	189

(Source: Bank of New York Mellon's Depositary Receipts directory as of May 11, 2010)

**Table 2. A List of Advanced Economies As Classified By the International Monetary Fund**

<b>Asia</b>	<b>Europe</b>
Australia	Austria
Hong Kong SAR	Belgium
Japan	Cyprus
Korea	Denmark
New Zealand	Finland
Singapore	France
Taiwan	Germany
	Greece
	Iceland
	Ireland
	Italy
	Luxembourg
	Malta
	Netherlands
	Norway
	Portugal
	Slovenia
	Spain
	Sweden
	Switzerland
	United Kingdom

**Figure 1. Plot of  $c$  versus  $\theta$  (for  $f = 1$ )**

